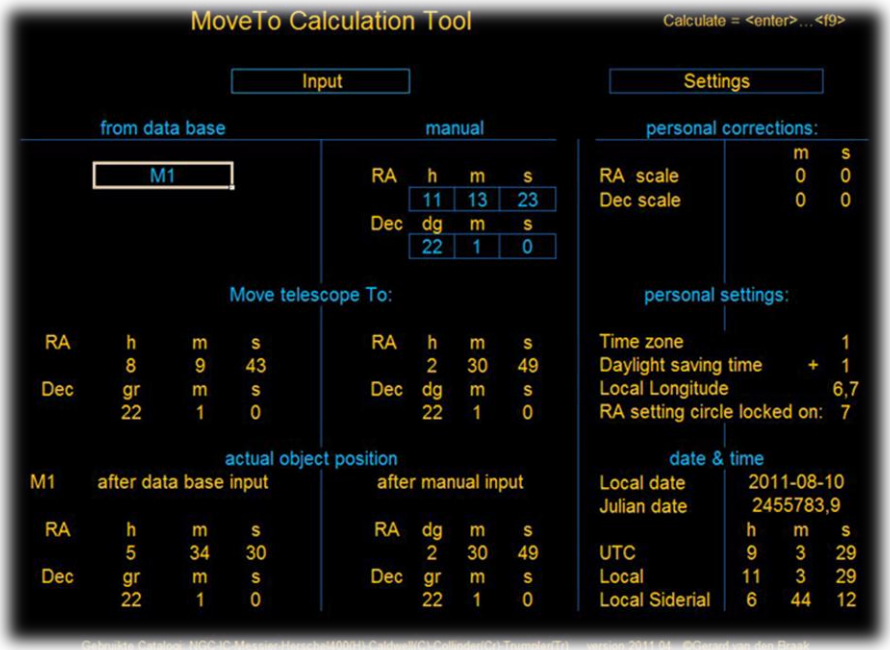
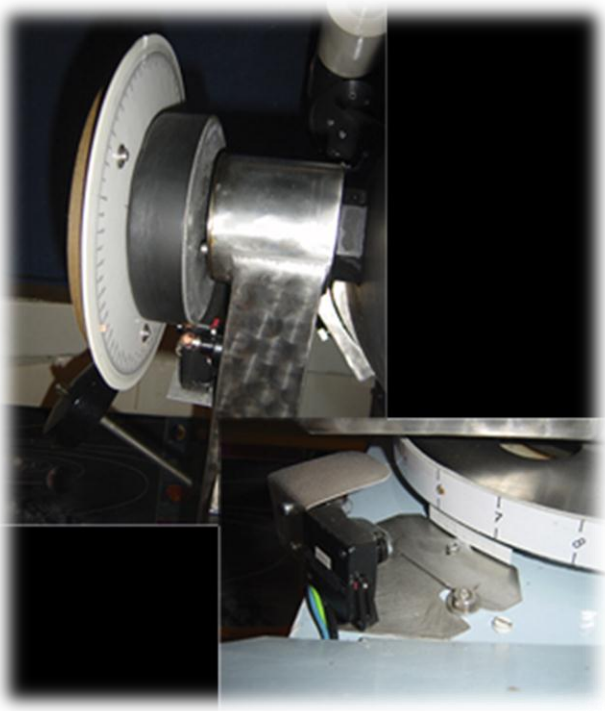
MoveTo

User's Manual
Telescope calculation tool





Contents

Purpose: 3

Conditions: 3

Structure: 3

Operation: 3

Protection: 4

Exercise 1: approaching data base objects 5

Exercise 2: protecting sheets 6

Settings: 7

Exercise 3: actual object position 9

MoveTo in practice: 10

How to use MoveTo *with* the data from the data base 10

How to use MoveTo *without* the data from the data base: so manually 11

You have discovered something. What is its position? 12

Purpose:

- MoveTo is meant for mounted telescopes without a GoTo-system
- MoveTo has been developed to find objects in the sky without arithmetical work.
  It is an alternative for a GoTo mount.
- MoveTo has got a data base of over 13,000 objects.
- MoveTo also allows manual input e.g. for Moon, comets or objects that are not included in the data base. Therefore you will need to know the coordinates.
- MoveTo also calculates the position of an unknown object found with the telescope.
- MoveTo also calculates:
    - Gregorian date (i.e. civil date)
    - Julian date (common practice for astronomical observations)
    - Local time (CEST or CET)
    - Local Sidereal Time (LST)

Conditions:

1. MoveTo is an Excel spreadsheet program.
2. Pointing the telescope to the south, fix the right ascension disk of the mount preferably on the 12-hour position.
   If this is impossible for any 'technical' reasons then fix it on some other (full) hour.
3. Fix the declination disk on 0-degrees declination.
4. The more accurate the graduation of the disks, the preciser the reading out will be possible.

Structure:

The Excel spreadsheet program has got four worksheets named as follows:

- MoveTo
- Calculations
- Catalogue
- Information

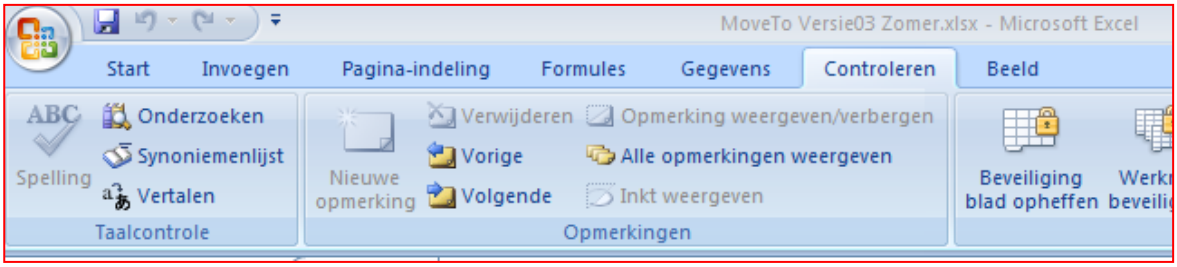
Operation:

The MoveTo sheet consists of two parts. The left part with the caption 'Input', and the right with the caption 'Settings'.

To make the program do its job press <ENTER>, and for every next calculation <F9>.

Protection:

The four tabbed sheets (at the bottom) are protected.
The sheets 'Calculations', 'Catalogue' and 'Information' are protected with a password, so that only the undersigned can change them.
Making changes in the 'MoveTo sheet', however, is necessary, for you need to adapt the 'personal settings' to your personal situation , as you know.
This sheet is also protected, it is true, but protected without a password. In order to make any changes it is necessary to unprotect the sheet.



- In Excel 2007 and later click 'Unprotect sheet' and make your changes. NB: the text of the button has changed into 'Protect sheet'. See picture below.

Clicking on this button results in the appearance of a dialog box in which you can specify how you want to protect the MoveTo sheet.

- Do not fill up a password.

- Do not remove the tick at the top left and the one before 'Select unlocked cells'.

So: just click OK, and the sheet is protected again.

Do not forget this, or else you are running the risk of losing data!

Exercise 1: approaching data base objects

Click on ‘M1’ and then a few times on <ENTER>. You will see that only the free cells can be approached.
The cell with 'M1’ is the input-cell for the (13,000) objects stored in the data base.
Therefore simply type in this cell for:

Messier objects:	M (1-110)	type e.g. M33
NGC objects:	NGC….	type e.g. NGC1234
IC objects:	IC….	type e.g. IC66
Caldwell objects:	C (1-110)	type e.g. C41
Herschel objects:	H (1-400)	type e.g. H93
Collinder objects:	Cr (1-471)	type e.g. Cr 12
Trumpler objects:	Tr (1-37)	type e.g. Tr17

MoveTo is indifferent to capital letters. Type without interspacing.

Exercise 2: protecting sheets

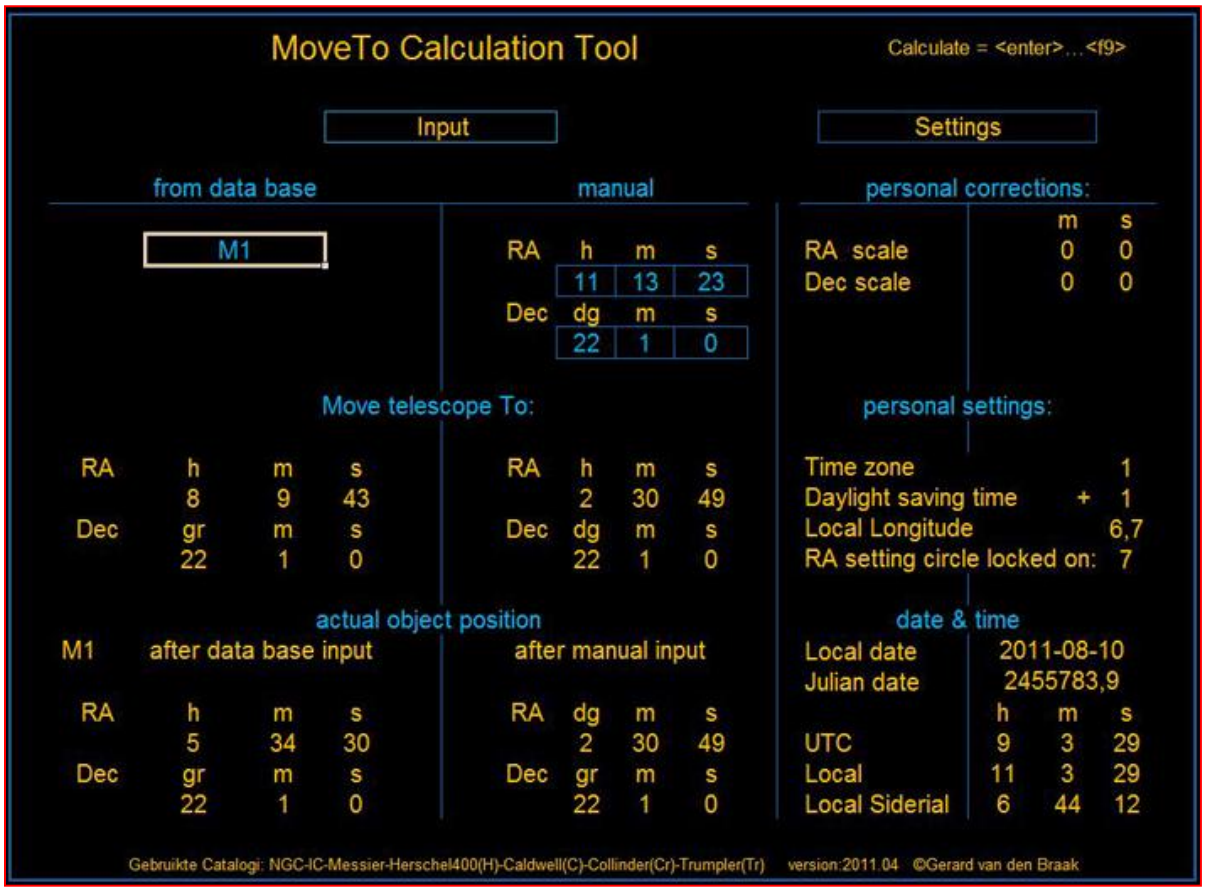
a. Remove the protection of the MoveTo-sheet.
b. Change the local longitude, but reset it to 6.7
c. **Protect the sheet again!**

NB:

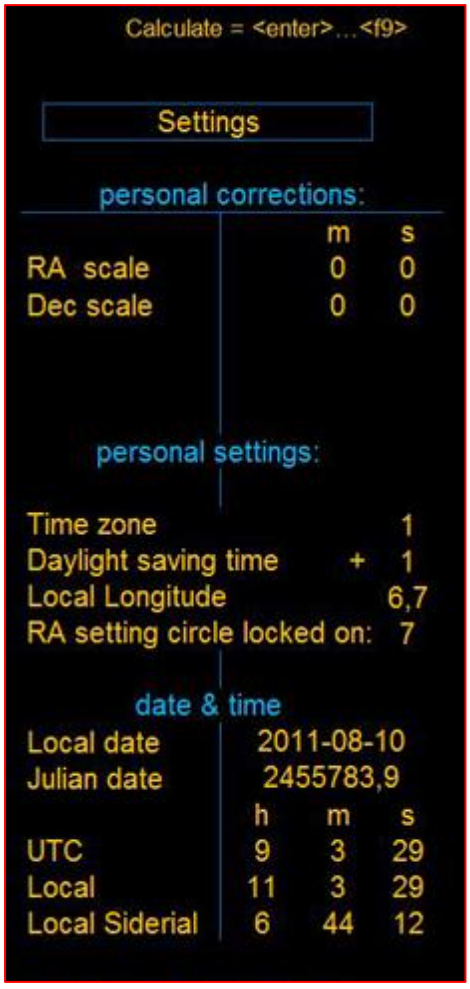
- All the tabbed sheets are protected. Do not forget to protect the sheet again after the removal of the protection and the other changes made in the MoveTo sheet.
- If you want to keep the changes made, then save them.
- If you have entered e.g. M106 Excel will gather this as a change and will ask at closing down if you want to save the changes, even if you have not changed anything at all. It is wise not to save 'this change', so that you will not run the risk of losing cell information.

It is possible to make a summer- and a winter-version of MoveTo
This may come in handy because now you are always obliged to make a choice between the two versions, and this prevents an error at the turn of the daylight saving time.

- Save a program-version with daylight saving time '1' and name it e.g. "MoveTo Summer".
- Now copy the complete program, and then change the daylight saving time from '1' to '0' and name this version "MoveTo Winter".



Settings:



Now let us look at the right side of the MoveTo sheet. It consists three items namely:

- *Personal corrections.*
  - ✓ RA & Dec scales

    When you have had MoveTo calculate where to point the telescope there is every chance the object is not in the field of view. Probably there is an inaccuracy in your default setting of the RA-disk and/or the Dec-disk. Minutes and seconds can be corrected only. If the difference is larger the disk has to be moved.

    In the available fields for 'personal corrections' adjustments may be filled up, so that from now on the program will take these adjustments into account.
    Suppose the RA turns out to be 45 seconds further than the calculated position, then fill up -45 there.

- *personal settings*
  - ✓ *Time zone*

    This is just information, and is not used. This information is in the computer clock.
  - ✓ Daylight saving time.

    We are all familiar with winter- and summertime or daylight saving time. It is necessary to specify whether it is winter- or summertime. Therefore fill up '0' for wintertime, and '1' for summertime/daylight saving time.
  - ✓ Local Longitude.

    The longitude of your place of observation has to be filled up here. Default is 6.7, for my residence, Zuidlaren. Mind that this is east (of Greenwich). If your location is west (of Greenwich) just put a minus sign before it. So fill up here your local meridian (i.e. the one of your location.

  - ✓ RA-setting circle locked on:

    As the system needs a reference point, we have fixed the RA setting circle (See Conditions,

item 2). After having fixed the 12-hour point at the indicator arrow, fill up '12' here. The example picture shows '7', because I have put the 7-hour point opposite the indicator arrow. The program provides for this option, because the indicator arrow may have been placed somewhere at the side, or you may have placed it there yourself for an easier reading out.

NB: Changing these values can only be done when the sheet protection has been removed. (Refer to the above section 'Protection')

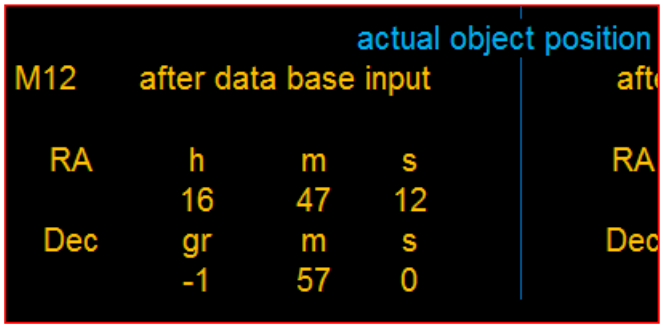
It may come in very handy to fix the RA hour-disk on e.g. the 12-hour (setting) point. This will prevent negative numbers, so that it will result in a more agreeable operation. I have fixed my disk on the 7-hour point.
Furthermore I have pointed cheap security cameras to my RA- and Dec setting circles, which can be read out on a monitor. Now I can operate my telescope remotely:

- MoveTo calculates the desired telescope position .
- I can read out the telescope position from the monitor.
- I can operate the RA and Dec with my remote-controlled motors, and move the telescope to the desired position while looking at the monitor.
- Refer to my personal solution:
  http://www.sterrenwacht.eu/datasheet%20equipment%20Camera%20RA-readout.htm
  en
  http://www.sterrenwacht.eu/datasheet%20equipment%20Camera%20DEC-readout.htm

- date & time
  These are the results of calculations. You cannot change anything here. It is just information. The whole system is driven by the computer clock. Therefore see that the clock is running on time. As a rule it is automatically synchronized as soon as you are connected with the internet.

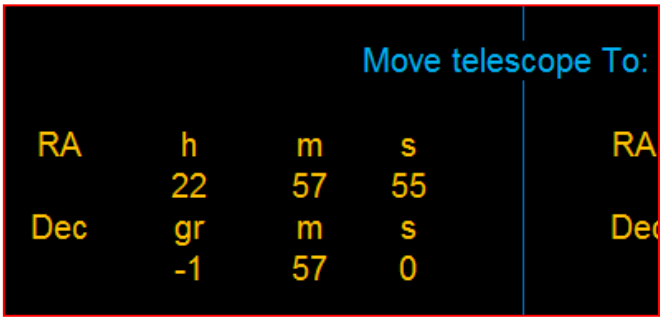
Exercise 3: actual object position

Type M12 in the field “from data base” in the column ‘Input', and then <Enter>.



You will now see the actual object position on the left of the group ‘actual object position’ below ‘after data base input’. These are the data of M12 from the data base.

Now look at the left box below ‘Move telescope To’ and you might see e.g.:



It turns out that the telescope has to be moved to another position than the box ‘after data base input’ indicates. This is because in this example the ‘RA-setting circle’ is ‘locked on’ ‘7’ and not on ‘12’, and of course because M12 is not in the south but somewhere else in the sky.

After pressing <F9> some time later, you will find that the values of the RA have changed. And that is correct. Every second later you should move the telescope a little further, as you know, to see the desired object. Therefore it is recommended to press <F9> once more after adjusting the telescope in order to make sure that the telescope is still pointing into the right direction. Every second counts!

MoveTo in practice:

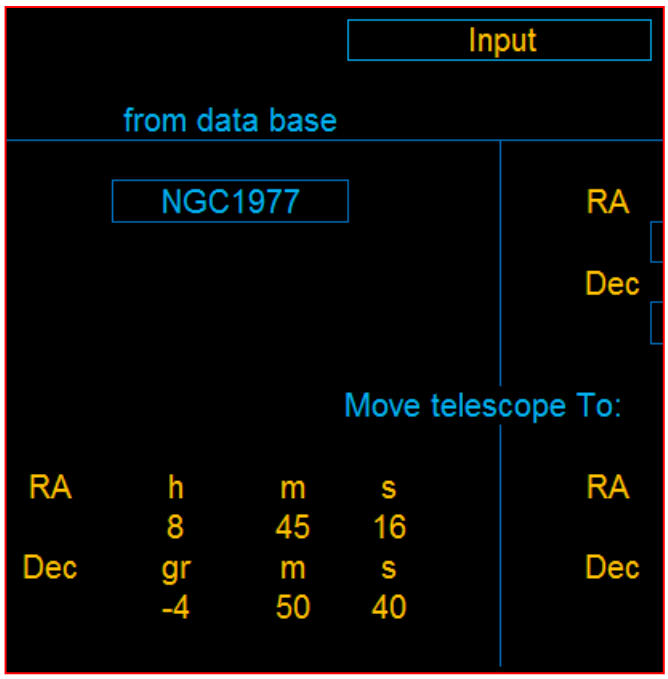
How to use MoveTo *with* the data from the data base

1. Before using MoveTo first fill up the 'Settings', as explained before.

2. Type in the field (with standard M1) the desired object, e.g. NGC1977 (Refer to Exercise 1)

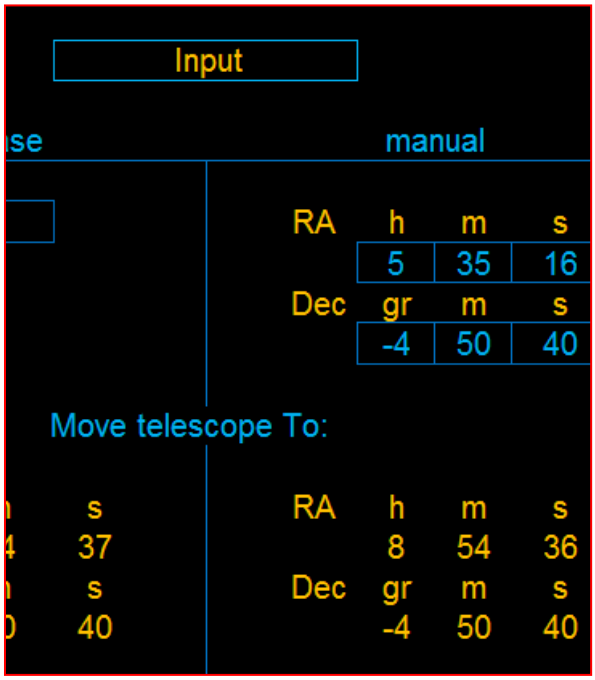
3. <Enter>. Press <F9> for recalculation or an extra check.

4. Move the telescope to the RA and Dec indicated in the six cells below 'Move telescope To', respectively h-m-s for the right ascension, and dg-m-s for the declination. In the next example it reads:
   RA: $8^h\ 45^m\ 16^s$
   Dec: $-4^0\ 50'\ 40''$



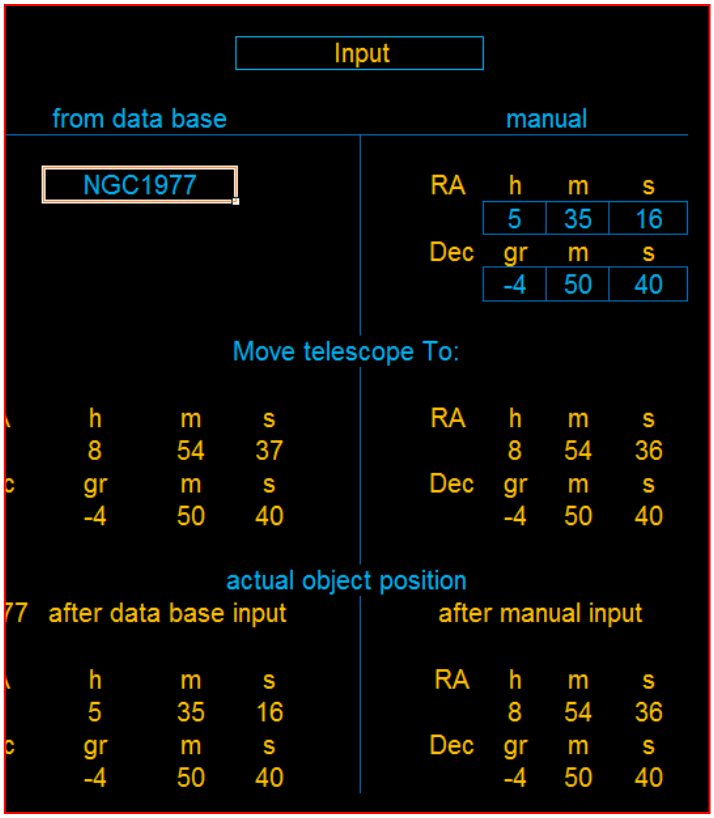
How to use MoveTo *without* the data from the data base: so manually

Suppose you want to look at a planet, the Moon, or any other object not included in my data base. You ought to know the coordinates of course, or else it does not work. These coordinates can be found in planetarium programs or the like



1. Type your data in the (6) cells below 'Input' – 'manual'.
2. <Enter>. Press <F9> for recalculation or an extra check.
3. Move the telescope to the RA and Dec indicated in the six cells below 'Move telescope To', respectively h-m-s for the right ascension, and dg-m-s for the declination. In the next example it reads:
   RA: $8^h\ 54^m\ 36^s$
   Dec: $-4^0\ 50'\ 40''$

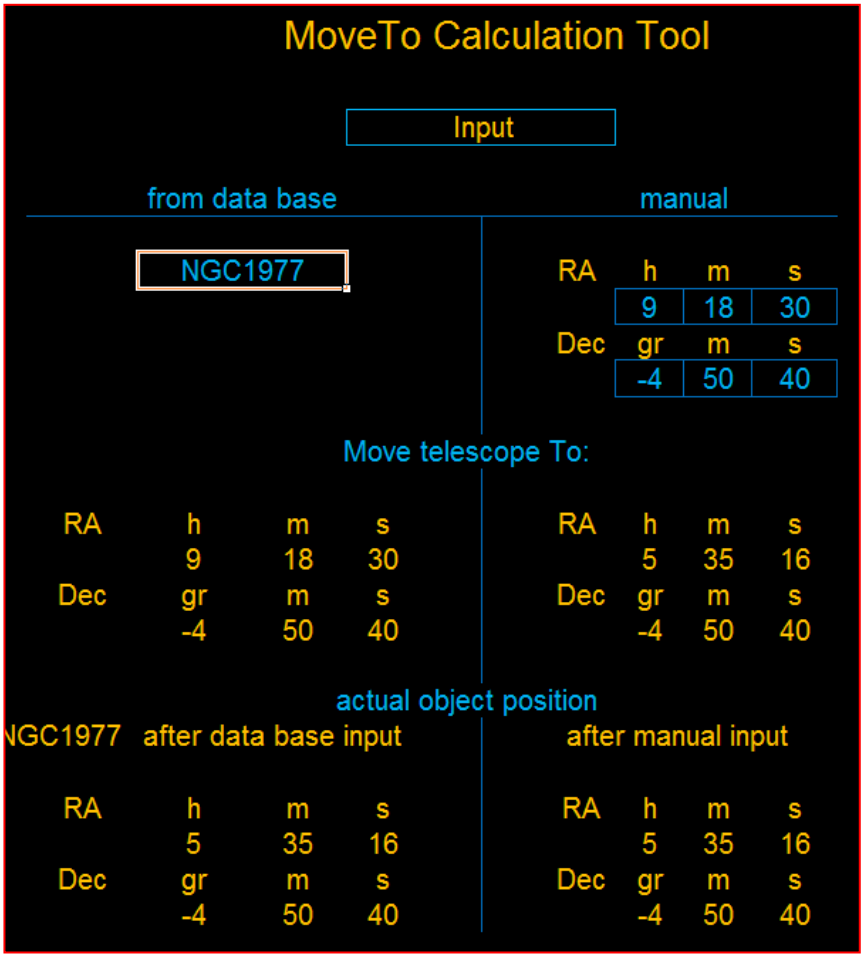
NB:
In the left part of the MoveTo sheet, the calculation part, below 'Input' there are two columns, namely: 'from database' and 'manual'. As you have probably noticed the MoveTo sheet consists of two calculation units. The left one for the calculation of the objects included in the data base, and the right one for the calculation of the objects *not* included in the data base. The unused cells will not turn blank; be aware of the column you are busy with.



Stay in the same column.
So, at 'Input from data base' you read out the 'actual object position' in the left column in the box 'after data base input'.
At 'Input' – 'manual' you read out the data in the right column in the box 'after manual input'.

You have discovered something. What is its position?

If you have discovered an unknown object in the sky, you would like to know its coordinates. So others will also be able to find it.
Just reading out the setting circles is not correct, as you have filled up something in the part 'Settings': e.g. a personal correction for RA scale and/or Dec scale, or your reference point for RA is not '0' but '7'. The result of all this is that the actual position cannot be read out from the setting circles.



After filling up the data of the setting circles of your telescope into the six cells below 'Input' – 'manual', and then pressing <F9>, the actual position of your object can be read out in the box 'actual object position' – 'after manual input'.
Mind, that during this action and the pointing of the telescope to your object, time has continued. It indicates the position of just that moment. The indication cannot be accurate to a second.

In a MoveTo sheet I have pretended to go and observe NGC1977. The program calculates the desired telescope position, and indicates this in the six cells of the left box below 'Move telescope To'.
After that I have filled up the same data in the six cells below 'Input' – 'manual' (as if these are the data from the setting circles). After an <Enter> you will see the actual position of the found object in the right-hand box below 'actual object position' - 'after manual input'.
Check:
If you now look at the left-hand box you will read the same values for NGC1977, i.e. the data from the data base.
So the calculation is correct!

Gerard van den Braak